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### Accounting and finance literacy and entrepreneurship: an exploratory study

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# **Accounting and finance literacy and entrepreneurship: an exploratory study**

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# **Accounting and finance literacy and entrepreneurship: an exploratory study**

## **Abstract**

The aim of this study is to investigate whether the level of financial literacy differs significantly among entrepreneurs in three European countries: Italy, Spain, and the UK. Moreover, I analyze whether financial literacy fosters or hinders entrepreneurial resilience and success. I find that the level of basic financial literacy is significantly lower among entrepreneurs in the UK. I provide an explanation based on job opportunities arguing that basic financial literacy increases the chances of survival of a business, whereas advanced financial literacy decreases it. I propose a taxonomy linking levels of financial literacy with different approaches to financial management. I conclude that a “conservative” approach to financial management (cash based, debt-averse and diversified) is more likely to guarantee survival even if it is not necessarily the best way to maximize firm value.

## 1. INTRODUCTION

Comparative International Entrepreneurship (CIE) is still developing as a field of enquiry. According to Oviatt and McDougall (2005, p. 540), we can distinguish two sub-fields within this area of study, “one focusing on the cross-national border behavior of entrepreneurial actors and another focusing on the cross-national border comparison of entrepreneurs, their behaviors, and the circumstances in which they are embedded”. This study adopts the second perspective by looking at entrepreneurs and their characteristics across three European countries: Italy, Spain, and the UK. The aim of this research is to investigate whether the level of financial literacy differs significantly among self-employed people in these three countries.

Moreover, the study analyzes whether financial literacy fosters or hinders entrepreneurial resilience and success. Hence, it mixes the individual level of analysis with the firm level of analysis (Terjesen et al., 2016). Better financial knowledge should help entrepreneurs at managing their business both on the operational side (Davila and Foster, 2005) and on the financial side (Atkinson, 2017). However, a higher knowledge of financial tools and concepts may also be associated with a riskier approach to the quest for returns and, consequently, a higher chance of failure (Cassar, 2004).

Using a sample of self-employed people in Italy, Spain, and the UK, I find that the level of basic financial literacy is significantly lower among entrepreneurs in the UK. I interpret this result in terms of job opportunities. Highly financially literate individuals in the UK have better options to use this knowledge in well paid job as employees. I also find that basic financial literacy increases the chances of survival of a business, whereas advanced financial literacy decreases it. I conclude that a “conservative” approach to financial management (cash based, debt-averse and diversified) is more likely to guarantee survival even if it is not necessarily the best way to maximize firm value.

This study contributes to the relatively new and scant literature on financial literacy and entrepreneurship. Cumurovic and Hyll (2019) use data from Germany and find a positive effect of financial literacy on the probability of being self-employed. Brindusa et al. (2021) examine a sample of small Spanish enterprises and document that owners of smaller enterprises are characterized by a lower level of financial literacy. My study adds the international comparison and explores the association of financial literacy with business resilience performance. Alperovych et al. (2021) use a sample of Dutch entrepreneurs and self-employed individuals and show that higher financial literacy is associated with better business performance. While they use a self-reported measure of financial knowledge, I use a test-based measure of financial literacy and provide international comparisons.

The paper is organized as follows. In the next section I review the relevant related literature. Then I present the sample and the survey used to construct the test-based measures of financial literacy. I then describe the international differences in financial literacy within the sample and study the association between financial literacy and business resilience and performance. Finally, I provide a discussion of the results and some conclusions.

## 2. LITERATURE REVIEW

The study of the relationship between financial literacy and entrepreneurship is at the crossroad between at least three strands of research<sup>1</sup>. First, the literature of financial literacy and decision making. The seminal works on financial literacy of households have documented some stylized facts: the level of financial knowledge of the general population is fairly low; and women, younger and older people tend to be less financially literate than the rest of the population (Lusardi and Mitchell, 2014). Moreover, a higher level of financial literacy is associated with better

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<sup>1</sup> Calcagno et al. (2019) provide a comprehensive review of the existing literature on this topic. Here I present only the most important ideas. The interested reader is invited to consult their review.

financial decisions and financial planning (Lusardi and Mitchell, 2007; van Rooij et al., 2011).

Secondly, a branch of the literature on entrepreneurship and entrepreneurial finance has studied the effect of education on the choice between going for a paid job in an existing company or becoming self-employed. This literature has found mixed results. While Carr (1996) finds a positive effect, Rees and Shah (1986), Blanchflower et al. (2001) and Thomas (2009) find that education has a negative effect on the likelihood of being self-employed concluding that better educated people tend to prefer to work as employees. Moreover, Bates (1990) and Pennings et al. (1998) find that education has a positive effect on the probability of survival of a firm. Nguyen et al. (2020) run a bibliometric analysis of the most important articles on entrepreneurial finance and identify seven different domains: (1) venture capital financing of the entrepreneur; (2) crowdfunding; (3) a venture's activities and financial performance; (4) social entrepreneurship; (5) financial risk; (6) microfinance; and (7) human, social, and financial capital. The study of financial literacy and entrepreneurship falls within the last domain, as we consider financial literacy as part of the human capital of the entrepreneur. There is evidence that entrepreneurs with a higher level of general education are more prone to use external sources of finance (Colombo et al., 2019; Mina et al., 2013). Given the correlation that may exist between the general level of education and financial literacy, this is an important element for this study.

Finally, the literature on accounting and entrepreneurship has shown that the adoption of sophisticated management control systems could be a crucial element in determining a successful transition from the start-up phase to a subsequent growth phase (Davila and Foster, 2005; Davila et al., 2010). The founder needs to be able to understand the need to adopt a more professional and less personal approach to management to complete the transition phase successfully. Among the management control systems, financial planning and financial evaluation play a prominent role.

The proper use of different financing instruments as well as a good accounting and finance knowledge by the founder-manager are key for the chances of growth and success of a business venture. Hence, based on literature on households' financial decision making, on entrepreneurial finance, and on accounting and entrepreneurship, we may expect to find a positive association between financial literacy and entrepreneurial resilience and success.

Very few studies have directly investigated these intuitions.

Cumurovic and Hyll (2019) investigate whether financial literacy is one of the personal traits that distinguish entrepreneurs from wage earners. They use the German SAVE study that collects data on the saving behavior of German households. These data are well suited for their purpose because they allow to separate wage earners from self-employed people while they also include information about the level of financial literacy of the respondents. Hence, the data allow to estimate the effect of financial literacy on the probability of being self-employed. This effect turns out to be positive.

Brindusa et al. (2021) use a survey developed by the OECD targeted at measuring financial literacy within small enterprises rather than within households. The survey aims at measuring the financial knowledge of the person in charge of taking financial decisions. This survey was administered to a representative sample of the population of Spanish enterprises with less than 50 employees. The main finding is that the level of financial knowledge is lower for smaller enterprises (less than 20 employees) than for bigger enterprises (between 20 and 49 employees). This result hints at the possibility that financial literacy is associated with a better performance of the business, but this link is not directly explored in the study.

To the best of our knowledge, Alperovych et al. (2021) is the only existing study that focuses on the effect of financial literacy on the performance of entrepreneurs. They use a survey administered by the Dutch Chamber of Commerce to their panel of entrepreneurs. Contrary to most studies on financial

literacy, the survey measures “self-reported” financial literacy rather than trying to directly measure it through specific questions on financial topics. It also collects self-reported information about the performance of the business such as gross margin, revenue, and revenue growth. The results suggest that the level of self-reported financial literacy correlates positively with performance for all these variables.

I extend these studies by using data collected at the same time and with the same methodology for three countries (Italy, Spain, and the UK). This allows me to run international comparisons not yet examined in previous studies. Moreover, this is the first study that addresses the association between test-based measure of financial literacy with business resilience and performance.

### 3. DATA

#### 3.1 *The Sample*

Between 2015 and 2016 a survey was administered by a professional firm to samples representative of the geographical distribution of self-employed people in three countries: Italy, Spain, and the UK. In line with Cumurovic and Hyll (2019) and with many previous studies on entrepreneurship, we proxied the characteristic of being an “entrepreneur” with “self-employment”<sup>2</sup>. The size of the sample was fixed at 400 self-employed people in each of three countries for a total of 1,200 surveys. The choice of the sample and the deployment of the survey were done by the same international data collection company in every country. This guarantees within sample consistency.

The three countries were chosen for two reasons. First, they constitute an interesting combination for their specific characteristics within Europe. The UK is a common law country, with a fairly stable political system and home to the biggest European Financial center (London). Italy is a code law country with a

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<sup>2</sup> See, for example, Caliendo et al. (2010) or Unger et al. (2011).



fairly unstable political system. Spain is also a code law country but with a peculiar political history heavily influenced by a long dictatorship and a strong independentism movement. In terms of the characteristics of their economies in 2014, unemployment was highest in Spain with 24.5%, lowest in the UK with 6.1% with Italy in the middle with 12.7%. Among the people employed, in the UK 82.7% were in the Services sector, whereas in Italy and Spain the percentage was smaller being 72.5% and 78.2% respectively. Moreover, in Spain and in the UK only 13.9% and 14% respectively of the employed population was self-employed, whereas in Italy this percentage increased to 25.6%. If we look at indicators of the development of the financial sector, in 2014 in the UK 98.9% of the people aged 15 or more had an account with a financial institution, whereas in Spain this percentage was 97.6% and in Italy was 87.3%. Hence these three countries presented enough cross-country economic and institutional variation to guarantee that the cross-country comparison of the data had the potential to generate insights not achievable with a sample coming from a single country.

Second, the survey was originally designed by the author based on surveys on financial literacy used by previous literature (Lusardi and Mitchell, 2008; Van Rooij et al., 2011)<sup>3</sup>. Given that the author is fluent in the languages of the three countries (Italian, English and Spanish) and has lived for a substantial number of years and has taught accounting and finance at university level in each of the three countries, he could have direct control on the text of the survey in each of the three languages. Moreover, if needed, he could interact with any of the field agents no matter of which country. Hence, potential interferences or biases due to language problems could be kept at a minimum.

### 3.2 *The survey*

The first section of the survey dedicated to basic financial literacy was a replication of the survey used by Lusardi and Mitchell (2008). This part includes the “Big Three” questions used by the financial literacy literature to measure the

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<sup>3</sup> For a survey on the literature on financial literacy see Lusardi and Mitchell (2014).

basic level of financial literacy of an individual. These three questions deal with interest compounding, nominal versus real return and risk diversification<sup>4</sup>.

In the second part, five original questions were introduced aimed at measuring the level of advanced accounting and finance literacy. The approach is similar to Van Rooij et al. (2011). They extend the analysis of basic financial literacy in the Netherlands with a section about financial literacy among people participating in the stock market. They add 13 questions concerning various concepts related to stocks and risk diversification and divide the total of 16 questions into two categories: *basic* financial literacy (five questions) and *advanced* financial literacy (11 questions). In the survey used for this study I added five *advanced* questions devoted to the following topics:

- Perception of debt as a financing tool
- Evaluation of growth opportunities
- Cash vs accrual financial performance measurement
- Depreciation
- Economic vs financial profitability<sup>5</sup>

To simplify the exposition of the results, in the rest of the text I refer to the first three questions as the *traditional* or *basic* financial literacy questions and to the other five questions included in the second part as the *advanced* or *accounting and finance* literacy questions.

Before answering the questions of the financial literacy test, the subjects were asked to self-report their perceived level of financial literacy on a scale from 1 to 7.

## 4. EMPIRICAL RESULTS

### 4.1 General overview of the sample

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<sup>4</sup> See also Lusardi and Mitchell (2011).

<sup>5</sup> The full text of the advanced accounting and finance questions and the rationale behind these questions can be found in Appendix B.

In Table 1 we show the key demographic and educational characteristics of the sample.

[Table 1 around here]

In terms of gender, the sample has a majority of men (56.8%). This percentage is close to the situation in Italy (54.8%). In Spain men dominates with a much bigger proportion (68.8%) while the opposite happens in the UK where men are a minority (46.8%). Most of the sample is made of individuals between 35 and 54 years old (61.8%), but in the UK we have relatively older people (29% over 55), whereas in Spain the sample is comprised of relatively younger people (58.5% below 35).

With respect of education, 43.5% of the respondents has completed some university degree (either undergraduate or graduate) and another 13.3% has attended some university level courses. In terms of the self-reported level of financial education close to half (42.9%) of the sample ranks him/herself at 5 or above. In the UK, this percentage reaches 50.8%, whereas in Italy it is down to 37.4%.

Hence, one first conclusion of the study is that the demographic and educational characteristics of self-employed people are quite different among countries. In the UK, the sample is female dominated, older and apparently more financial educated. In Italy and Spain males dominate the sample. The Spanish sample is younger and less confident in its financial education, whereas the Italian sample is the one most close to the average values for most of the variables.

Table 2 describes the features of the businesses run by these individuals.

[Table 2 around here]

The majority of these ventures (53.8%) are more than 5 years old, however there is a substantial part of them (33%) that is either still in the start-up phase (10.5%), i.e., less than 1 year old, or in the initial phase of development (22.5%), i.e., less than 3 years old. On a general level, the age structure of the businesses owned by the individuals included in the sample is similar in the three countries. However, the Italian sample is characterized by slightly more “mature” businesses (56.5%) and slightly less “young” businesses (27.8%), whereas the UK has a substantially lower percentage (49.8%) of businesses that are more than 5 years older. The vast majority of these activities are *micro* enterprises both in terms of level of sales (94.3%) and in terms of employees (96.6%)<sup>6</sup>. They operate mainly in the tertiary sector (83.1%).

For most individuals (70.5%), this is their first experience as entrepreneurs. However, those that are serial entrepreneurs (29.5%) are likely to have experienced some success in previous ventures (81.9%).

#### 4.2 *Financial literacy and its association with personal characteristics*

In Table 3 I report the percentage of respondents that chose the correct answer for each of the eight questions for the total sample and for each country. The percentage of individuals choosing the right answer for all the questions is also included.

[Table 3 around here]

Focusing on the *traditional* questions (the “Big Three” questions), the evidence suggests that the question on risk diversification is the most difficult one both for the complete sample and for the subsamples by country. The percentage of people answering all the three questions correctly is less than 50% in each of the three countries, with the UK registering a percentage (38.5%) substantially below that the one found in Italy (46.8%) and Spain (46.0%).

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<sup>6</sup> A firm is considered *micro* if it has less than € 2.000.000 of sales or if they have less than 10 employees.

If we shift the attention to the questions dedicated to *advanced* financial literacy, the data shows that the most difficult question is by far the question about the comparison between ROA and ROE and how it relates to the level of debt. Very few people selected the correct answer. To remove the impact of this question on the results, we compute the percentage of people answering correctly all the *advanced* questions excluding this very difficult question. Overall, the differences among countries are less pronounced for these *advanced* questions compared to those registered for the *traditional* questions.

To test the association of financial literacy with the personal characteristics of the entrepreneurs I use the following regression model:

$$FINLIT = \alpha_1 Gender + \alpha_2 Age + \alpha_3 SerialEnt + \alpha_4 FinLitLevel + \alpha_5 Educ + \alpha_6 Italy + \alpha_7 UK + \epsilon \quad (1)$$

where

<i>FINLIT</i>	= one of various indices of financial literacy (see below)
<i>Gender</i>	= dummy for the biological sex of the respondent (1=Female)
<i>Age</i>	= age of the respondent in years
<i>SerialEnt</i>	= dummy that takes the value 1 if the respondent has started other businesses in the past, or 0 otherwise
<i>FinLitLevel</i>	= level of self-reported financial literacy of the respondent (1 to 7)
<i>Educ</i>	= level of education of the respondent (1= Primary to 7=Graduate)
<i>Italy</i>	= dummy that takes value 1 if the respondent is from Italy
<i>UK</i>	= dummy that takes the value 1 if the respondent is from the UK <sup>7</sup>

In the first set of regressions, I use as dependent variables the number of correct answers to the *traditional* questions ( $n_{tradright}$ ), the number of correct answers to the *advanced* questions ( $n_{advallright}$ ) and the total number of correct answers ( $n_{totalright}$ ). Given the discrete nature of the dependent variables, the model is

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<sup>7</sup> Summary statistics for the variables included in these and the following regressions are provided in Appendix A.

estimated using multivariate logit regressions. The results are reported in Table 4.

[Table 4 around here]

My findings using this sample of entrepreneurs replicates regularities already shown to exist in samples of the general population around the world: women score worse than men, financial literacy increases with age, and it is positively correlated with education<sup>8</sup>. I also notice a positive association between self-reported financial literacy and test-based financial literacy. The fact of being a serial entrepreneur does not correlate with financial literacy.

With respect to country differences, the results suggest that the UK's entrepreneurs have a significantly lower level of basic financial literacy that those located in Spain or Italy. No other significant country differences are detected.

It is interesting to compare these results with the data of the first Global Report on Financial Literacy carried out by the Global Financial Literacy Excellence Center in collaboration with Gallup, the World Bank and Standard & Poor's rating services in 2015 (cf. Klapper et al., 2015). This report used representative samples of the general population in 140 countries to measure the level of financial literacy on a global level. The global survey used four questions of which, three of them were very similar to the three *traditional* questions used in my study. The additional question was related to interest calculation. The Global Report shows that the percentage of individuals answering at least three out the four questions correctly in the three countries analyzed in this study were as follows:

- Italy 37%
- Spain 49%
- UK 67%

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<sup>8</sup> Cf. Lusardi and Mitchell (2014), Klapper et al. (2015)

The ranking of financial literacy level for the three countries when we look at the general population (Global Report) is opposite than when we look at self-employed people (this study). At the level of the general population the most financially literate country is the UK followed by Spain and Italy. Among self-employed people, however, the most financially literate country is Italy followed by Spain and the UK (see Table 3). A possible interpretation of these differences could be the existence of better employment opportunities in the UK for financially literate individuals. As mentioned in the introduction, some the existing literature on general education and entrepreneurship finds a negative correlation between the formal educational level achieved and the likelihood of being self-employed (Rees and Shah, 1986; Thomas, 2009). If we extend this argument to the specific area of financial education and financial literacy, we can argue that in the UK there exist better job opportunities for financially literate people than in the case of Spain and Italy. Hence, these individuals can self-select out of the self-employed category. This could arguably explain why we find a lower level of financial literacy among self-employed people in the UK than in Spain and Italy.

Moreover, it is also interesting to compare the level of actual financial literacy with the level of self-reported financial literacy. As noticed above, according to the data collected on self-reported financial literacy, the UK ranks first, Spain is second while Italy is third. In terms of *actual* financial literacy, the ranking is the opposite (see Table 3). This is an important difference between the UK and the other two countries. Self-employed people in the UK are confident to have enough financial literacy to run their own businesses, even if this is not necessarily the case. Another study conducted on a sample of small business owners in the UK supports this argument. Brown et al. (2006) find that small business owners indeed recognize that they have some deficiency in financial literacy, but they do not consider this to be a crucial problem for them to run their businesses effectively. In fact, most of them still took care personally of the financial side of the business, confirming the idea that they believe that they have a sufficient understanding of financial matters. In Italy and Spain, however, there is more alignment between the self-perceived and the actual level of financial literacy.

Table 5 presents the results of running logit regressions estimating the probability of answering correctly to each one of the financial literacy questions.

[Table 5 around here]

The results indicate that only the regressions for the questions related to risk diversification (*Q3*), accrual vs cash accounting (*Q6*) and depreciation (*Q7*) show some country differences.

Self-employed people in the UK and in Spain are significantly less knowledgeable about basic risk diversification. In particular, the question on risk diversification (*Q3*) appears to be the one that determines the overall results about the relatively low level of financial literacy among self-employed people in the UK as compared to the other two countries. The coefficient for the UK is negative and significant at the 1% level.

With respect to the questions about accrual vs. cash accounting (*Q6*) and depreciation (*Q7*), self-employed people in the UK are significantly more likely to understand the difference between accrual and cash accounting, but less likely to account for investment properly.. These differences are important because they are directly related to the management of working capital, which is recognized as a crucial area by previous studies (Romero and Gray, 2002).

#### *4.3 Financial literacy, business resilience and business performance*

I now turn the attention to the potential role that financial literacy can play as a determinant of the resilience and the success of a business venture. To study this effect, I use the following regression model:

$$PERFORMANCE = \alpha_1 n\_tradright + \alpha_2 n\_advright + \alpha_3 Gender + \alpha_4 Age + \alpha_5 SerialEnt + \alpha_6 FinLitLevel + \alpha_7 Educ + \alpha_8 Italy + \alpha_9 UK + \varepsilon$$

(2)



Where PERFORMANCE is proxied by two variables: a) the age of the business (*B\_Age*); and b) the level of sales (*Sales*). Both dependent variables are non-continuous variables. The variable *B\_Age*, has four brackets: less than 1 year, between 1 and 3 year, between 3 and 5 years, more than 5 years. The variable *Sales* has three levels: Micro (less than €2,000,000), Small (between €2,000,000 and €5,700,000) and Medium/Big (more than €5,700,000). The dependent variable *B\_Age* capturing the business age can be seen more as a proxy of *business resilience* than a proxy of business success, given that most of the businesses in the sample stay small both in terms of sales and number of employees<sup>9</sup>.

Our main variables of interest are *n\_tradright* and *n\_advright* that are equal to the number of correct answers given respectively to the *basic* and the *advanced* financial literacy questions respectively. The control variables are the ones included in the previous analysis. I include an additional control variable (*Empl*) that is equal to the number of employees in the business. As before, a country dummy is also included to control for potential differences in the relationship between financial literacy and performance depending on the country of operation.

Given that the dependent variables are ordinal and standard OLS techniques cannot be used, I estimate equation 2 using an ordered multivariate logit model. Table 6 present the results.

[Table 6 around here]

When *B\_Age* is a considered as a dependent variable, the coefficient capturing the effect of *basic* financial literacy (*n\_tradright*) is positive and statistically significant, while the coefficient for *advanced* accounting and finance literacy (*n\_advright*) shows a statistically significant negative association with resilience. I also find a significant positive association with self-reported financial literacy

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<sup>9</sup> The use of discrete variables as performance variables is similar to Alperovych et al. (2021)

and the age of the respondent. Finally, the findings suggest that the businesses owned by UK self-employed individuals are less resilient than those owned by Spanish entrepreneurs; the opposite is true for business owned by Italian entrepreneurs compared to their Spanish counterparts.

The dependent variable for the second column is the best proxy available in the dataset for business performance, i.e., level of sales. In this case, *basic* financial literacy (*n\_tradright*) is not significant. However, the coefficient for *advanced* accounting and finance literacy (*n\_advright*) is negative and statistically significant, while the coefficient of self-reported financial literacy (*FinLitLevel*) is significant and positively associated with *Sales*. The positive and significant association between number of employees (*Empl*) and the level of sales is not surprising. No country differences are detected.

Table 7 replicates the same analysis using different indices for financial literacy. I run a factor analysis on the probability of answering correctly each one of the eight questions. The results (untabulated) show that three factors are detected. The analysis of the factor loadings matrix allows me to label the three factors as follows: two of them represent *basic (traditional)* financial literacy (variable *TradLitFc*) and *advanced (accounting and finance)* literacy (variable *AdvLitFc*) respectively. The third factor is associated with the probability of answering correctly the question on the relationship between ROE and ROA (Q8) and the optimal level of debt (Q4) (variable *ROE\_Fc*).

[Table 7 around here]

The results presented in Table 7 are in line with those presented in Table 6. However, it is interesting to notice the significant and negative association between the ROE vs ROA (Debt) factor and business resilience (*B\_Age*) which reinforces the previous result of a negative association between *advanced* accounting and finance literacy and the age of the business.

## 5. DISCUSSION: FINANCIAL MANAGEMENT PROFILES

A possible interpretation for these results centers around the risk attitude of self-employed people. On one hand, a high level of *basic* financial literacy indicates awareness of risk and how it can be mitigated through risk diversification. Moreover, the results have shown that the answer to this question is crucial for explaining country differences in my sample. On the other hand, a low level of *advanced* financial literacy indicates two attitudes towards financial matters: debt aversion and cash-oriented management. As shown, the answer to the question on Accrual versus Cash accounting is also crucial for country differences, with the UK entrepreneurs being the least cash oriented of the sample. By developing this intuition, I have built a taxonomy of entrepreneurial attitudes towards financial management which is presented in Figure 1.

[Figure 1 around here]

Combining the two dimensions of financial literacy (*basic vs. advanced*) and their levels (*high vs. low*) it is possible to define four different attitudes towards financial management. Entrepreneurs that combine low levels of financial literacy on both dimensions can be defined as “*Naïve*” financial managers. They do not know much about financial matters, and they are likely to have become entrepreneurs either because they felt it like a mission or because they did not have any other choice (i.e., necessity entrepreneurs).

A low level of *accounting and finance* literacy is combined with a high level of *basic* financial literacy results in a “*Conservative*” approach. The entrepreneur is aware of risk and the need for risk diversification, but the individual is debt-averse and cash oriented. As discussed before, this combination may favor the resilience of the business venture, but it is unlikely to produce the best results in terms of performance. In my sample, entrepreneurs from Italy seem, on average, to fit in this category better than their counterparts from Spain and the UK. They have the highest level of *basic* financial literacy combined with a relatively low level of *advanced* accounting and finance literacy. Moreover, they have the lowest level of

self-reported financial literacy. This conservative profile is associated with the largest share of ventures that have lasted for more than 5 years.

The bottom right quadrant of the taxonomy shows entrepreneurs with a low level of *basic* financial literacy but a relatively high level of *advanced* accounting and finance literacy. This combination can give rise to a “*Risky*” approach to financial management. The perception of risk is low, and a relatively higher importance is given to financial and economic performance compared to cash accumulation. The perception of debt is not negative. In my sample, entrepreneurs from the UK seem to fit into this category. They score the lowest on the basic question related to diversification (Q3), but they score higher in the question on the calculation of profit on an accrual basis rather than on a cash basis (Q6). Moreover, they have the highest average of self-reported financial literacy. This can be interpreted as a sign of high confidence in themselves. The fact that this is a risky but potentially profitable way to manage a business is reflected in the fact that UK ventures are those that, on average, last less but sell more.

Finally, the bottom right quadrant presents a situation where both levels of test-based financial literacy score high. This combination should be associated with a “*Sophisticated*” attitude towards financial management. This profile fits well with the results presented by Davila and Foster (2005) and Davila et al. (2010). A professional approach to management and, in particular, financial management is a necessary condition for a successful transition from the start-up phase to a more mature phase of a business venture.

Of the three countries represented in my sample of self-employed entrepreneurs, the most difficult to place in the taxonomy is Spain. Entrepreneurs located in Spain combine a fairly high level of *basic* financial literacy with the highest (within the sample and excluding Q8, the ROA vs ROE question) *advance* accounting and finance literacy. This is probably a sign of an economy still in transition from a traditional and conservative approach to a more sophisticated approach.

Overall, my findings provide support to the idea that a conservative approach to financial management may be positive for business resilience. They also highlight the danger of adopting a risky approach especially if combined with overconfidence in your own financial knowledge.

This interpretation of the findings is in line with the literature that has questioned the traditional association between risk-taking and success in business ventures (e.g., Murman and Sandana, 2012; Miller, 2007). It also speaks to the call to give more importance to the “identity” of the individual in the study of entrepreneurial behavior (Gruber and Macmillan, 2017). This approach underlines the importance of going beyond pure economic logics and explanations when trying to make sense of entrepreneurial behavior. Within the framework presented here, an identity interpretation of entrepreneurs could explain why *Naïve* or *Risky* financial management profiles, for example, exist in the real world. In the terminology of Gruber and McMillan (2017), “Communitarian” or “Missionary” entrepreneurs are perfectly compatible with a *Naïve* financial profile given that their motivation is not primarily economical. “Darwinian” entrepreneurs, on the other hand, are more likely to have a *Risky* profile, that can evolve into a *Sophisticated* profile if the venture succeeds and grows.

## 6. CONCLUSIONS

This study examines the level of financial literacy using an international sample of self-employed individuals covering three European countries: Italy, Spain, and the UK. Two sets of questions related to accounting and finance concepts were administered to the respondents. Three traditional questions aimed at measuring the level of *basic* financial literacy, and five newly created questions aimed at measuring *advanced* accounting and finance literacy.

The evidence suggests that there exist some significant differences in the level of financial literacy between the three countries. The UK self-employed individuals have less *basic* financial knowledge and, in particular, have a lower understanding of the principle of risk-diversification. But no significant differences were found

between the three countries in terms of the general level of *advanced* accounting and finance literacy. However, the UK respondents understand better the difference between accrual and cash accounting, whereas Spanish respondents are the worst in this area. I also investigate the relationship between financial literacy and business resilience and success. *Basic* financial literacy is positively associated with business resilience. *Advanced* financial literacy, however, has a negative association.

I propose a taxonomy to interpret the results in terms of risk-taking financial management profiles. A higher level of *basic* financial literacy implies a better understanding of the principle of risk diversification, whereas a lower level of *advanced* financial literacy implies a cash oriented and debt averse financial management style. Hence, the combination of high *basic* financial literacy and low *advanced* accounting and finance literacy characterizes a *conservative* approach to financial management that is more likely to guarantee the survival of the business. This is precisely what the results suggest. Spain and Italy, two countries characterized by a relatively higher proportion of *conservative* self-employed individuals in terms of their attitude towards financial issues, also have a higher proportion of older businesses. On the contrary, in the UK, a country characterized by a *riskier* class of self-employed individuals, the figures show a lower proportion of older businesses. Moreover, the businesses of UK respondents are relatively smaller in terms of sales and employees.

The differences encountered in this study are coherent with the differences between the three economies. At the time of the study, the UK was the more financially developed economy among the three countries under investigation and it also had the biggest proportion of individuals employed in the service sector. This feature can explain the lower level of financial literacy of the people that are self-employed. In the UK, more financially literate individuals had more opportunities to find a well-paid job in the service sector. Italy had the lowest percentage of people employed in the service sector and the highest percentage of self-employed individuals. Hence, in this country a relatively higher proportion of financially literate people were likely to end up running their own business due to

the lack of better opportunities. This is reflected in the highest level of *basic* financial literacy showed by self-employed in this country. Spain had the highest level of *advanced* financial literacy (if we exclude the ROA vs ROE question) and the highest proportion of serial entrepreneurs. This combination possibly reflects the fact that the Spanish economy was in between a *traditional* model in line with the Italian economy, and the “financially oriented” model that characterizes the UK economy.

The sample used in this study is certainly limited. It would be interesting to extend it to other economies such as the US or China and test the general validity of the taxonomy proposed here. Moreover, as it is the case with many of the previous studies on financial literacy, the empirical analysis presented here can only document association. To test the direction of causality we need to find effective instrumental variables, but this has been proven to be a difficult task so far and it remains a crucial area for future research.

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Figure 1. Taxonomy of entrepreneurial attitudes towards financial management

		<i>Basic Financial Literacy</i>	
		<b>Low</b>	<b>High</b>
<i>Advanced (Acc. &amp; Finance) Literacy</i>	<b>Low</b>	<i>Naïve</i>	<i>Conservative</i>
	<b>High</b>	<i>Risky</i>	<i>Sophisticated</i>

Table 1. Demographic and educational characteristics of the sample

	Country			Total
	Italy	Spain	UK	
<i>Gender</i>				
Male	54.8%	68.8%	46.8%	56.8%
Female	45.3%	31.3%	53.3%	43.3%
<i>Age (years)</i>				
18_24	2.5%	0.0%	3.8%	2.1%
25_34	21.0%	18.5%	15.3%	18.3%
35_44	33.8%	40.0%	20.0%	31.3%
45_54	28.2%	31.3%	32.0%	30.5%
55_64	14.5%	10.3%	29.0%	17.9%
<i>Education</i>				
1. Primary	0.0%	2.8%	0.3%	1.0%
2. Secondary	4.3%	4.8%	14.2%	7.8%
3. Professional school	4.3%	18.8%	17.8%	13.6%
4. High school	23.0%	17.8%	21.0%	20.6%
5. Some university degree	26.3%	13.5%	0.0%	13.3%
6. Undergraduate degree	7.5%	28.0%	35.8%	23.8%
7. Graduate degree	34.5%	14.5%	10.0%	19.7%
n.a.	0.3%	0.0%	1.0%	0.4%
<i>Financial Literacy (self-reported on a scale from 1=low to 7=High)</i>				
1	7.2%	5.3%	2.0%	4.8%
2	12.0%	12.0%	6.5%	10.2%
3	19.3%	20.0%	10.8%	16.7%
4	24.3%	22.0%	30.0%	25.4%
5	22.3%	27.8%	28.5%	26.2%
6	11.8%	10.8%	17.5%	13.3%
7	3.3%	2.3%	4.8%	3.4%
N	400	400	400	1200

Table 2. Features of the businesses

	Country			Total
	Italy	Spain	UK	
<i>Business Age</i>				
Less than 1 year	8.8%	11.0%	11.8%	10.5%
Between 1 and 3 years	19.0%	22.8%	25.8%	22.5%
Between 3 and 5 years	15.8%	11.3%	12.8%	13.3%
More than 5 years	56.5%	55.0%	49.8%	53.8%
Total	100.0%	100.0%	100.0%	100.0%
<i>Sales</i>				
Micro	92.4%	95.3%	95.5%	94.3%
Small	5.6%	3.5%	1.9%	3.7%
Medium/Big	2.0%	1.2%	2.6%	2.0%
Total	100.0%	100.0%	100.0%	100.0%
<i>Employees</i>				
0-9	95.9%	95.2%	98.6%	96.6%
10-49	2.7%	3.7%	1.1%	2.5%
50-249	1.1%	0.8%	0.3%	0.7%
250+	0.3%	0.3%	0.0%	0.2%
Total	100.0%	100.0%	100.0%	100.0%
<i>Sector</i>				
Primary	4,7%	2,0%	1,4%	2,7%
Secondary	17,0%	16,0%	9,6%	14,2%
Tertiary	78,4%	82,0%	89,0%	83,1%
Total	100,0%	100,0%	100,0%	100,0%
<i>Serial Entrepreneur</i>				
NO	79.3%	62.0%	70.3%	70.5%
YES	20.8%	38.0%	29.8%	29.5%
Total	100.0%	100.0%	100.0%	100.0%
<i>Success Previous Project</i>				
NO	22.9%	19.1%	13.4%	18.1%
YES	77.1%	80.9%	86.6%	81.9%
Total	100.0%	100.0%	100.0%	100.0%
N	400	400	400	1,200

Table 3. Percentage of individuals answering correctly

	Country			Total
	Italy	Spain	UK	
<i>Traditional questions</i>				
Q1 Interest compounding	81.0%	84.3%	82.8%	82.7%
Q2 Nominal vs Real	68.3%	71.0%	69.8%	69.7%
Q3 Diversification	64.0%	57.3%	45.8%	55.7%
All <i>traditional</i> answers correct	46.8%	46.0%	38.5%	43.8%
<i>Advanced questions</i>				
Q4 Debt	25.3%	27.8%	25.8%	26.3%
Q5 Sales	48.8%	49.5%	55.8%	51.3%
Q6 Accrual	50.2%	43.3%	55.5%	49.7%
Q7 Depreciation	53.8%	53.3%	39.8%	48.9%
Q8 ROE vs ROA	11.3%	8.0%	8.3%	9.2%
All answers to <i>advanced</i> questions correct	2.5%	1.3%	1.0%	1.6%
All answers to <i>advanced</i> questions correct except Q8	10.8%	13.5%	10.3%	11.5%
<hr/>				
Self-reported Financial Literacy (avg)	3.9	4.0	4.5	4.1

Table 4. Financial literacy and personal characteristics of the respondents

	<i>n_tradright</i>	<i>n_advallright</i>	<i>n_totalright</i>
<i>Gender</i>	-0.716 (6.20)**	-0.252 (2.31)*	-0.503 (4.64)**
<i>Age</i>	0.046 (8.15)**	0.012 (2.25)*	0.028 (5.34)**
<i>SerialEnt</i>	-0.049 (0.38)	0.148 (1.25)	0.064 (0.55)
<i>FinLitLevel</i>	0.279 (6.98)**	0.143 (3.83)**	0.226 (6.10)**
<i>Educ</i>	0.176 (5.10)**	0.189 (5.76)**	0.215 (6.64)**
<i>Italy</i>	0.053 (0.38)	0.072 (0.56)	0.054 (0.42)
<i>UK</i>	-0.414 (2.95)**	0.045 (0.34)	-0.147 (1.13)
N	1,195	1,195	1,195
LR Chi2	220.55	70.11	157.86
Prob >Chi2	0.00	0.00	0.00
Pseudo R2	0.07	0.02	0.03

The table presents the results of ordered logit regressions for each of the following three dependent variables: *n\_tradright* = number of the *traditional* “Big three” questions answered correctly; *n\_advallright* = number of the *advanced (accounting and finance)* questions answered correctly; and *n\_totalright* = *n\_tradright* + *n\_advallright*. The independent variables are as follows: *Gender* = dummy (1=Female); *Age* = age of the respondent; *SerialEnt* = dummy (1 if the respondent has started other businesses in the past); *FinLitLevel* = level of self-reported financial literacy (1 to 7); *Educ* = education (1= Primary to 7=Graduate); *Italy* = country dummy; *UK* = country dummy. The value of the z statistic is reported in parenthesis. \*  $p < 0.05$ ; \*\*  $p < 0.01$ .

Table 5. Personal characteristics and answers to specific questions

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>	<i>Q5</i>	<i>Q6</i>	<i>Q7</i>	<i>Q8</i>
	<i>Interest</i>	<i>Nominal vs Real</i>	<i>Diversification</i>	<i>Debt</i>	<i>Sales</i>	<i>Accrual</i>	<i>Depreciation</i>	<i>ROE vs ROA</i>
<i>Gender</i>	-0.456 (2.81)**	-0.813 (5.83)**	-0.523 (3.99)**	-0.264 (1.84)	-0.056 (0.45)	-0.157 (1.26)	-0.328 (2.61)**	-0.282 (1.28)
<i>Age</i>	0.028 (3.59)**	0.056 (7.91)**	0.037 (5.68)**	0.011 (1.62)	0.007 (1.14)	-0.001 (0.10)	0.023 (3.76)**	0.013 (1.28)
<i>SerialEnt</i>	-0.192 (1.07)	-0.189 (1.21)	0.115 (0.80)	0.206 (1.38)	0.268 (2.00)*	0.282 (2.09)*	-0.077 (0.56)	-0.614 (2.40)*
<i>FinLitLevel</i>	0.169 (3.07)**	0.149 (3.12)**	0.342 (7.36)**	0.128 (2.65)**	0.053 (1.28)	0.088 (2.08)*	0.123 (2.87)**	0.234 (3.09)**
<i>Educ</i>	0.093 (1.92)	0.160 (3.77)**	0.185 (4.65)**	0.173 (3.97)**	0.105 (2.82)**	0.178 (4.71)**	0.163 (4.27)**	0.069 (1.04)
<i>Italy</i>	-0.237 (1.21)	-0.113 (0.67)	0.342 (2.14)*	-0.139 (0.83)	-0.027 (0.18)	0.272 (1.83)	-0.034 (0.23)	0.283 (1.12)
<i>UK</i>	-0.184 (0.91)	-0.115 (0.66)	-0.679 (4.16)**	-0.096 (0.55)	0.254 (1.67)	0.566 (3.68)**	-0.623 (4.00)**	-0.145 (0.52)
<i>Cons</i>	0.094 (0.18)	-1.595 (3.44)**	-2.861 (6.34)**	-2.542 (5.21)**	-1.051 (2.54)*	-1.354 (3.24)**	-1.665 (3.90)**	-3.748 (4.96)**
<i>N</i>	1,195	1,195	1,195	1,195	1,195	1,195	1,195	1,195
LR Chi2	42.25	145.71	183.11	38.10	22.02	47.76	74.33	23.48
Prob >Chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudo R2	0.04	0.10	0.11	0.03	0.01	0.03	0.04	0.03

The table presents the results of running logit regressions for the probability of answering correctly to each one of the 8 financial literacy questions. The independent variables are as follows: *Gender* = dummy (1=Female); *Age* = age of the respondent; *SerialEnt* = dummy (1 if the respondent has started other businesses in the past); *FinLitLevel* = level of self-reported financial literacy (1 to 7); *Educ* = education (1= Primary to 7=Graduate); *Italy* = country dummy; *UK* = country dummy. The value of the z statistic is reported in parenthesis. \*  $p < 0.05$ ; \*\*  $p < 0.01$ .



Table 6. Financial literacy and business resilience and performance

	<i>B_Age</i>	<i>Sales</i>
<i>n_tradright</i>	0.171 (2.27)*	-0.191 (1.06)
<i>n_advright</i>	-0.127 (2.43)*	-0.377 (2.70)**
<i>Gender</i>	-0.008 (0.06)	-0.123 (0.36)
<i>Age</i>	0.079 (10.67)**	-0.035 (2.04)*
<i>SerialEnt</i>	-0.131 (0.87)	-0.237 (0.59)
<i>FinLitLevel</i>	0.094 (1.99)*	0.303 (2.48)*
<i>Educ</i>	-0.087 (2.09)*	0.027 (0.26)
<i>Empl</i>	0.333 (1.24)	1.402 (4.33)**
<i>Italy</i>	0.186 (1.14)	0.365 (0.90)
<i>UK</i>	-0.582 (3.40)**	-0.040 (0.09)
<i>N</i>	1,069	862
LR Chi2	178.31	58.68
Prob >Chi2	0.00	0.00
Pseudo R2	0.09	0.14

The table presents the results of running ordered logit regressions for each of the following two dependent variables: *B\_Age* = age of the business; *Sales* = level of sales of the business. The independent variables are as follows: *n\_tradright* = number of the *traditional* “Big three” questions answered correctly; *n\_advright* = number of the *advanced* (accounting and finance) questions answered correctly; *Gender* = dummy (1=Female); *Age* = age of the respondent; *SerialEnt* = dummy (1 if the respondent has started other businesses in the past); *FinLitLevel* = level of self-reported financial literacy (1 to 7); *Educ* = education (1=Primary to 7=Graduate); *Empl* = number of employees; *Italy* = country dummy; *UK* = country dummy. The value of the z statistic is reported in parenthesis. \*  $p < 0.05$ ; \*\*  $p < 0.01$ .

Table 7. Financial literacy and business resilience and performance: alternative specification

	<i>B_Age</i>	<i>Sales</i>
<i>TradLitFc</i>	0.315 (2.79)**	-0.354 (1.34)
<i>AdvLitFc</i>	-0.172 (1.75)	-0.713 (2.78)**
<i>ROE_Fc</i>	-0.516 (2.77)**	0.118 (0.27)
<i>Gender</i>	-0.012 (0.09)	-0.117 (0.34)
<i>Age</i>	0.079 (10.66)**	-0.037 (2.09)*
<i>SerialEnt</i>	-0.119 (0.79)	-0.209 (0.52)
<i>FinLitLevel</i>	0.108 (2.27)*	0.289 (2.34)*
<i>Educ</i>	-0.087 (2.07)*	0.020 (0.20)
<i>Empl</i>	0.329 (1.23)	1.426 (4.39)**
<i>Italy</i>	0.219 (1.33)	0.334 (0.81)
<i>UK</i>	-0.602 (3.49)**	-0.005 (0.01)
N	1,069	862
LR Chi2	184.78	59.61
Prob Chi2	0.00	0.00
Pseudo R2	0.09	0.14

The table presents the results of running ordered logit regressions for each of the following two dependent variables: *B\_Age* = age of the business; *Sales* = level of sales of the business. The independent variables are as follows: *TradLitFc* = factor that summarizes *basic* financial literacy; *AdvLitFc* = factor that summarizes *advanced* financial literacy; *ROE\_Fc* = factor that represents answering correctly to the ROE vs ROA question; *Gender* = dummy (1=Female); *Age* = age of the respondent; *SerialEnt* = dummy (1 if the respondent has started other businesses in the past); *FinLitLevel* = level of self-reported financial literacy (1 to 7); *Educ* = education (1= Primary to 7=Graduate); *Empl* = number of employees; *Italy* = country dummy; *UK* = country dummy. The value of the z statistic is reported in parenthesis. \*  $p < 0.05$ ; \*\*  $p < 0.01$ .

## APPENDIX A. Summary statistics for the variables used in the logit regressions

Panel A	Italy					UK					Spain					
	Min	Mean	Median	Max	N	Min	Mean	Median	Max	N	Min	Mean	Median	Max	N	
<i>Gender</i>	0	0.453	0	1	400	0	0.533	1	1	400	0	0.313	0	1	400	
<i>Age</i>	18	42.785	42.5	64	400	18	46.435	48	64	400	25	42.863	43	64	400	
<i>Educ</i>	2	5.323	5	7	399	1	4.551	4	7	396	1	4.765	5	7	400	
<i>SerialEnt</i>	0	0.208	0	1	400	0	0.298	0	1	400	0	0.380	0	1	400	
<i>B_Age</i>	1	3.200	4	4	400	1	3.005	3	4	400	1	3.103	4	4	400	
<i>Sales</i>	1	1.096	1	3	301	1	1.071	1	3	312	1	1.059	1	3	254	
<i>Empl</i>	1	1.058	1	4	365	1	1.017	1	3	353	1	1.062	1	4	356	
<i>FinLitLevel</i>	1	3.905	4	7	400	1	4.480	5	7	400	1	3.963	4	7	400	
<i>n_tradrigh</i>	0	2.133	2	3	400	0	1.983	2	3	400	0	2.125	2	3	400	
<i>n_advright</i>	0	1.893	2	5	400	0	1.850	2	5	400	0	1.818	2	5	400	
<i>n_totalright</i>	0	4.025	4	8	400	0	3.833	4	8	400	0	3.943	4	8	400	
Panel B	Total															
	Min	Mean	Median	Max	N											
<i>Gender</i>	0	0.433	0	1	1200											
<i>Age</i>	18	44.028	44	64	1200											
<i>Educ</i>	1	4.880	5	7	1195											
<i>SerialEnt</i>	0	0.295	0	1	1200											
<i>B_Age</i>	1	3.103	4	4	1200											
<i>Sales</i>	1	1.076	1	3	867											
<i>Empl</i>	1	1.046	1	4	1074											
<i>FinLitLevel</i>	1	4.116	4	7	1200											
<i>n_tradrigh</i>	0	2.080	2	3	1200											
<i>n_advright</i>	0	1.853	2	5	1200											
<i>n_totalright</i>	0	3.933	4	8	1200											

## APPENDIX B

### *Advanced accounting and finance literacy questions (Questions 4-8 of the survey)*

Question 4 (Q4): *“To have no debt is always a desirable situation for a company”*

Possible answers: True False I don't know No answer

The purpose of this question is to check the perception of debt that entrepreneurs have. If the answer chosen is “True”, I interpret this as an aversion to debt as a way of financing your business. The determination of the optimal level of debt is one of the key issues in the theory of corporate finance. Notwithstanding the difficulties in determining a precise value for the optimal level of debt, it is very rarely the case that it is exactly 0. So, the answer “True” detects an intuitive and highly conservative way to approach the search for sources of finance for the business. A financially sophisticated entrepreneur should choose the answer “False”.

Question 5 (Q5): *“If sales are growing, this means that the business is healthy”*

Possible answers: True False I don't know No answer

The purpose of this question is to check the capacity of managing the growth of the business. Sales growth is not enough as an indicator of sound performance. A business that is growing may not be profitable and may end up in bankruptcy. The answer “True” detects a naïve and possibly dangerous approach to business evaluation. Again, a financially sophisticated entrepreneur should choose the answer “False”.<sup>10</sup>

Question 6 (Q6): *“If at the end of a certain period (day, month, year,...) a business has more cash than at the beginning of the period, this means that the business has made a positive profit”*

Possible answers: True False I don't know No answer

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<sup>10</sup> Or at least “I don't know”, “No answer”.

The purpose of the third question is to check the ability to distinguish cash flow from the accrual-based calculation of profit. The use of the accrual principle is a fundamental characteristic of modern financial accounting. Again, the answer “True” detects a rudimental approach to the calculation of business financial and economic performance that does not consider the importance of allocating revenues and expenses to the correct period from an economic point of view.

Question 7 (Q7): *“A business has just bought a piece of equipment that has cost €200. This equipment is going to be used for 5 years. The profit of the current year will be reduced by:”*

Possible answers:    More than €200    Less than €200    Exactly €200  
                                 I don’t know            No answer

This question is strictly related to the previous question, given that it relates to the difference between cash flow and accrual accounting. However, it focuses more specifically on the correct evaluation of an investment from an economic point of view, while drawing up the accounts at the end of the year. Any answer other than “Less than €200” detects an intuitive approach that could be detrimental for the correct evaluation of growth generating investments.

Question 8 (Q8): *“The return on assets is called ROA and the return on equity inverted into the business by shareholders is called ROE. In general, the level of debt is more sustainable if:”*

Possible answers:    ROA > ROE    ROA < ROE    ROA = ROE    I don’t know  
                                 No answer

This question is by far the more demanding. Its purpose is to see if the entrepreneur has some knowledge of the so called “leverage effect”, i.e., the capacity of debt to increase the return for the owners. The “leverage effect” is positive when “ROA < ROE”. In this case, the cost of debt is lower than the economic profitability of the company and this means that debt is more sustainable. The ability to answer this question correctly allows us to detect very high levels of financial knowledge.